	Background Statistics for Data Sets with Non-Detects								
1	**Background Statistics for Data Sets with Non-Detects**								
2	**User Selected Options**								
3	Date/Time of Computation	7/30/2013 1:14:58 PM							
4	From File	WorkSheet.xls							
5	Full Precision	OFF							
6	Confidence Coefficient	95%							
7	Coverage	95%							
8	rent or Future K Observations	1							
9	mber of Bootstrap Operations	2000							

PAHs

General Statistics

	D			L
Total Number of Observations	71	Number of Missing Observations		0
Number of Distinct Observations	68			
Number of Detects	60	Number of Non-Detects		11
Number of Distinct Detects	60	Number of Distinct Non-Detects		8
Minimum Detect	6.12	Minimum Non-Detect		1.5
Maximum Detect	464.5	Maximum Non-Detect		10
Variance Detected	7048	Percent Non-Detects		15.49%
Mean Detected	90.37	SD Detected		83.96
Mean of Detected Logged Data	4.165	SD of Detected Logged Data		0.869

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	1.983	d2max (for USL)	3.089

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.742	**Normal GOF Test on Detected Observations Only**	
5% Shapiro Wilk P Value	1.122E-13	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.169	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.114	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

Mean	76.64	SD	82.98
95% UTL95% Coverage	241.2	95% KM UPL (t)	215.9
90% KM Percentile (z)	183	95% KM Percentile (z)	213.1
99% KM Percentile (z)	269.7	95% KM USL	333

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	76.69	SD	83.53
95% UTL95% Coverage	242.3	95% UPL (t)	216.9
90% Percentile (z)	183.7	95% Percentile (z)	214.1
99% Percentile (z)	271	95% USL	334.7

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.458	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.767	etected data appear Gamma Distributed at 5% Significance Lev	
K-S Test Statistic	0.0733	**Kolmogrov-Smirnoff GOF**	
5% K-S Critical Value	0.117	etected data appear Gamma Distributed at 5% Significance Lev	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.62	k star (bias corrected MLE)	1.551
Theta hat (MLE)	55.77	Theta star (bias corrected MLE)	58.28
nu hat (MLE)	194.5	nu star (bias corrected)	186.1
MLE Mean (bias corrected)	90.37		
MLE Sd (bias corrected)	72.58	95% Percentile of Chisquare (2k)	7.989

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

	A	B	C	D	E	F	G	H	I	J	K	L
63	GROS may not be used when kstar of detected data is small such as < 0.1											
64	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
65	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
66					Minimum	0.01				Mean		76.37
67					Maximum	464.5				Median		59
68					SD	83.82				CV		1.097
69				k hat (MLE)		0.426		k star (bias corrected MLE)				0.417
70				Theta hat (MLE)		179.3		Theta star (bias corrected MLE)				183
71				nu hat (MLE)		60.48		nu star (bias corrected)				59.25
72			MLE Mean (bias corrected)			76.37		MLE Sd (bias corrected)				118.2
73		95% Percentile of Chisquare (2k)				3.417			90% Percentile			214.1
74				95% Percentile		312.7			99% Percentile			559.6
75	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
76	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
77					WH	HW					WH	HW
78	Approx. Gamma UTL with 95% Coverage				361.4	475.2		95% Approx. Gamma UPL			284.4	353.4
79			95% Gamma USL		756.8	1196						
80												
81	The following statistics are computed using gamma distribution and KM estimates											
82	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
83				k hat (KM)		0.853			nu hat (KM)			121.1
84					WH	HW					WH	HW
85	Approx. Gamma UTL with 95% Coverage				304	344.2		95% Approx. Gamma UPL			245.5	268.8
86			95% Gamma USL		594.4	757.9						
87												
88	Lognormal GOF Test on Detected Observations Only											
89		Lilliefors Test Statistic				0.0869		Lilliefors GOF Test				
90		5% Lilliefors Critical Value				0.114	Detected Data appear Lognormal at 5% Significance Level					
91	Detected Data appear Lognormal at 5% Significance Level											
92												
93	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
94			Mean in Original Scale			77.97		Mean in Log Scale				3.879
95			SD in Original Scale			82.42		SD in Log Scale				1.045
96			95% UTL95% Coverage			384.2		95% BCA UTL95% Coverage				346.1
97		95% Bootstrap (%) UTL95% Coverage				375.3			95% UPL (t)			279.6
98			90% Percentile (z)			184.6		95% Percentile (z)				269.9
99			99% Percentile (z)			550.4			95% USL			1222
100												
101	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
102			KM Mean of Logged Data			3.593	95% KM UTL (Lognormal)95% Coverage					796.6
103			KM SD of Logged Data			1.557		95% KM UPL (Lognormal)				496.2
104		95% KM Percentile Lognormal (z)				470.8		95% KM USL (Lognormal)				4461
105												
106	Background DL/2 Statistics Assuming Lognormal Distribution											
107			Mean in Original Scale			76.69		Mean in Log Scale				3.6
108			SD in Original Scale			83.53		SD in Log Scale				1.567
109			95% UTL95% Coverage			818.8		95% UPL (t)				508.4
110			90% Percentile (z)			272.9		95% Percentile (z)				482.2
111			99% Percentile (z)			1403		95% USL				4638
112	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
113												
114	Nonparametric Distribution Free Background Statistics											
115	Data appear to follow a Discernible Distribution at 5% Significance Level											
116												
117	Nonparametric Uppper Limits for BTVs(no distinction made between detects and nondetects)											
118			Order of Statistic, r			70		95% UTL with95% Coverage				406
119			Approximate f			1.842		Confidence Coefficient (CC) achieved by UTL				0.876
120			95% UPL			233.4			95% USL			464.5
121		95% KM Chebyshev UPL				440.9						
122												
123	Note: The use of USL to estimate a BTV is recommended only when the data set represents a background											
124	data set free of outliers and consists of observations collected from clean unimpacted locations.											

	A	B	C	D	E	F	G	H	I	J	K	L
125			The use of USL tends to provide a balance between false positives and false negatives provided the data									
126			represents a background data set and when many onsite observations need to be compared with the BTV.									
127												